Contents

Boxes

Table

Chapter 1
Water Plan Overview

Importance of Water to California's Well-Being

California water planning and management requires full and balanced consideration of the State's richly diverse people, environments, businesses, land uses, climates, geology, and variable hydrology. Diverse and variable water uses are distributed throughout the State and over time, which do not coincide with natural water supplies.

With more that 36 million people, California is the nation's most populous state and the third largest in size. All aspects of the California economy are dependent on water. Together with the abundant natural resources and business opportunities, the people have made the State's $1.4 trillion economy the fifth largest in the world. Electronics, aerospace, banking, the film industry, and recreation are only a few of the businesses that make California a unique economy.

Providing food and fiber crop products to Californians, as well as to other states and countries, consumes, and will continue to consume, more water than is consumed by all other household needs. California is the top-ranked state in the value of agricultural production, contributing over half of the nation's fruit, nut, and vegetable production. Many counties rely on agriculture as a primary economic contributor.

Since the 1800s, California has experienced aquatic and riparian habitat degradation and declines in freshwater biodiversity throughout the State. Flows on many rivers and streams currently do not resemble natural hydrographs, which is a contributing factor to impaired ecosystem functions, reduction and loss of native species and habitats, impacts on commercial fisheries, and degraded water quality.

The linkage between water and energy management in California is complex and has both economic and environmental benefits and impacts. Pumping, treating, and distributing water and wastewater consume approximately 10 percent of the State's total electricity, with the State Water Project (SWP) the largest single user of electricity in the State. The use of fresh water for power plant cooling has increased because of new power plants, placing added pressure on the State's, and in particular local, water supplies. Hydroelectric plants produce about 15 percent of the State's electricity with relatively low production cost, no emissions, and the ability to meet critical peak demands; however, they have changed river flows, stages, and temperatures and created barriers to fish passage.

As a result of increased competition among water uses, management of California's water system has become increasingly challenging, complex and at times contentious. However, water issues are being resolved with leadership from the State and federal governments and through partnerships with local and regional stakeholders. Local, regional, and State governments and water suppliers each have a role in improving water supply and quality reliability for the existing and future population and the environment.

Water conservation, efficient water management, and development of reliable, high quality, sustainable, and affordable water supplies are needed to maintain and improve California's economy, environment and standard of living. Today, regions are doing more to meet their water demands with water

conservation, reoperation of facilities, water recycling, groundwater storage and management, transfer programs, and in limited cases regional or local surface storage reservoirs.

Changing the Water Plan

The California Water Plan is described in the Water Code as the master plan to guide the orderly and coordinated control, protection, conservation, development, management and efficient utilization of the water resources of the state (Section 10005(a)). Water plan updates have always been an important source of information for water planners (DWR Bulletin 160 series). The first California Water Plan (DWR Bulletin 3, 1957) was the master plan for the State Water Project. Over the decades, DWR has updated it periodically with revised estimates of both future water demands and the delivery capability of existing and planned facilities. The difference between those estimates of water demand and supply, sometimes called "the gap," became an often cited detail of the water plan updates and used as a call for action (See Box 1-xx Updates of the California Water Plan).

Box 1-xx Updates of the California Water Plan (Bulletin 160 series)

In recent updates, the gap estimate was widely criticized for a number of reasons, including the assumptions used to estimate future water demands, the minimal consideration of economics, and the lack of consideration of multiple scenarios for both what future demands might be and how those demands could be met. As a result, many argued that the gap was either too high or too low, and few accepted it as a basis for future water management actions.

California water management has changed significantly over the past decades. State and federal projects have not expanded as originally expected; in fact, deliveries have been curtailed in recognition of environmental needs. In response, regional water planning efforts have emerged that are beginning to integrate a diverse set of water and resource management activities to meet a wide range of objectives from a local perspective. Consequently, water agencies, local governments, and the Legislature need the water plan to provide information and tools that will promote and support regional planning.

The Water Code, revised by recent legislation, requires that as part of its California water plan update, the Department of Water Resources (1) establishes and confers with an advisory committee composed of representatives of agricultural and urban water supplies, local government, business, production agriculture, and environmental interests, and other interested parties; (2) creates and conducts an open process, providing opportunity for the public to review and comment on the plan and the assumptions and estimates used in its development; (3) reports on the development of regional and local water projects; and (4) estimates water demand for future food and fiber production (See Box 1-xx Legal Requirements for California Water Plan). The Work Plan for Meeting Legal Requirements for the California Water Plan is included in the Reference Guide (Volume 4) describing how and when DWR will meet Water Code requirements during the phased work plan for completing this update (see Phased Work Plan in this chapter).

Box 1-xx Legal Requirements for California Water Plan

In January 2001 DWR expanded the public forum for preparing the California water plan update by including a 65-member advisory committee, a 350-member extended review forum, and a group of 2,000 interested members of the public. The advisory committee is composed of representatives of agriculture, urban water districts, businesses, environmentalists, Native Americans, environmental justice advocates, cities, counties, federal and State agencies, the California Bay Delta Authority, academia, and different regions of the State.

To continue to be a focal point for California water policy, the process for developing the water plan update and the information it contains must change—and is changing. *California Water Plan Update 2004* is a strategic planning document that better reflects the roles of the State and federal governments and the growing role of regionally based integrated resource planning in California water management.

Purpose of this Water Plan

California Water Plan Update 2004 provides decision-makers, resource managers, water suppliers, and all water users a strategic water plan for the next quarter century with specific goals, objectives, findings, and a robust set of recommended actions. This plan:

- Presents durable and achievable actions that if implemented will assure adequate, reliable, secure, affordable, and sustainable water of suitable quality for all beneficial uses to the year 2030.
- Recommends ways to assist and support local and regional planners to develop integrated resource plans, implement diverse management strategies, and coordinate land use planning with water planning and management.
- Recommends ways to strengthen the State of California's leadership, coordination, oversight, and public funding to protect, manage, and develop the State's water resources as a public trust asset and to rehabilitate and maintain its water infrastructure.
- Articulates the benefits, costs, tradeoffs, and implementation difficulties of the recommended actions to help decision-makers and resource managers make informed decisions on the mix of management strategies best suited to their needs.
- Outlines a process to improve water planning, data and analytical tools to make future water plan updates more precise and improve public access to water information.
- Recommends ways to promote equity in State water planning, management and funding.
- Identifies needed science as well as research and development to commercialize promising technologies.

It is noteworthy that by statute the California Water Plan cannot mandate actions nor authorize spending for its recommendations. As a strategic plan, *California Water Plan Update 2004* does not make project-specific or site-specific recommendations and, therefore, does not include environmental review and documentation as required by the California Environmental Quality Act. Consequently, policy makers and lawmakers must take further action to adopt the actions recommended in this water plan and to provide the public funding for their implementation. This underscores the need to have broad stakeholder and public participation and support for the water plan in order to have its recommendations realized.

Key Features

With assistance from the advisory committee, DWR developed a new planning framework for preparing the *California Water Plan Update 2004* and future water plan updates. This new framework is one of the significant accomplishments of this water plan and should serve as the cornerstone for future updates. The framework differs from prior water plans in the following key ways:

- The water plan was prepared using a *strategic planning process* that (1) considerably expanded public involvement and access to the State's water planning process; (2) sought collaborative recommendations that are more robust, have greater longevity and are more likely to be adopted by the Governor's Office, Legislature, and State, federal, and local agencies and governments, and resource managers; and (3) resulted in a strategic plan, as a living document with stated goals, objectives, and implementation plan, consisting of action plans, resource assumptions, implementation challenges and performance measures. Public outreach and involvement during the preparation of the plan, including a customer survey, is described in Volume 4 Reference Guide.

Box 1-xx Components of a Strategic Plan as Used for the Water Plan

- State and regional *water portfolios* cover the entire hydrologic cycle consisting of more than 80 categories of water use, supply, and management. Actual data are used for 3 recent but different water years—1998 (wet); 2000 (average), and 2001 (driest since extended drought). Prior water plan updates reported the developed water supply, presenting about 35 categories using trend based (or normalized) data to represent a typical average and typical dry year.
- In compliance with SB 672 (Machado), a *regional report* has been prepared for each of the 10 hydrologic regions and 2 overlay areas, Sacramento-San Joaquin River Delta and Mountain Counties. Each report includes major challenges, current programs and projects, and the regional water portfolios for each of the three water years.
- The water plan acknowledges and discusses the significant and inherent uncertainties facing California in the next 25 years and describes three plausible, yet very different *future scenarios* titled Current Trends Continued, Resource Sustainability, and Resource Intensive. Prior water plans considered a single "likely" future.
- A broad and diverse set of 25 *resource management strategies* and several *essential support activities* are included in the Water Plan to help regions develop more robust integrated resource plans for meeting future demands and sustaining the environment, resources, and economy.

To implement these features, DWR has made, or needs to make, significant analytical changes as summarized in Box 1-xx Analytical Changes.

Box 1-xx Analytical Changes

Key Themes

- **California needs to invest in water conservation, efficient water management, and development of reliable, high quality, sustainable and affordable water supplies to maintain and improve California's economy, environment, and standard of living.**

  The recommended actions of this water plan will help California prepare for a population of approximately 48 million by 2030 while considering the problems related to extreme hydrologic and catastrophic events, global climate change, maintaining our existing water management system, providing good water quality, eliminating groundwater overdraft, and protecting and enhancing the environment. Based on current trends, California's average-year water demand could increase between X.X million and X.X million acre-feet by 2030 (DWR is completing work to fill in this range for the June 24 Advisory Committee Meeting). Failure to plan and prepare for these problems and potential demands could have significant impacts on California's economy, the standard of living of our residents, and our natural resources.

  Water quality is of particular concern because in many areas surface water and groundwater are being impaired by natural and human-made contaminants that have effectively reduced the water supply that can be used. These contaminants degrade environmental resources, threaten human health, and increase water treatment costs. To safeguard water quality for all beneficial uses, the State should inventory and evaluate the effects of contaminants on surface water and groundwater quality and adopt a preventive strategy that promotes integration of source protection, pollution prevention, water quality matching, and, for drinking water, treatment and distribution.

  The State encourages resource planners and managers to examine all of the resource management strategies to identify combinations that are uniquely suited to their regional setting and goals and are cost effective, environmentally sound, and socially equitable—in other words, sustainable. The more a region can diversify its water management portfolio, the more robust and resilient it will be in facing future unknowns and the more it will be able to leverage and utilize its regional assets.

  As California's water use has grown, local agencies and governments have needed to use many different strategies to manage their water. This diversification has become even more essential with the increased understanding of the concurrent water demands of farms, cities, and the environment. The resource management strategies described in this water plan are building blocks for future integrated resource plans. Local agencies and governments should consider them in developing balanced portfolios for their future human and environmental water demands (see "Strategy Investment Options" table in Findings and Recommendations and also Volume 2 Resource Management Strategies).

- **Regions must play a critical role in California water planning and management, better coordinate water planning with land use planning and urban development, and diversify their portfolio of resource management strategies.**

  Regional planning can improve communication and collaboration within a region, which can provide benefits beyond any specific recommendation of the plan. Through a regional plan, a region can better articulate its water management needs to State and federal agencies and elected representatives. Regional plans can also provide a tool for otherwise separate agencies to collectively present information that may lead to improved State and federal policies, regulations, and laws related to water supply, water quality, environmental protection, flood control, and sanitation that directly affect the participating local agencies.

  The State recognizes the critical role regions must play in California water planning and management and must provide regions incentives and assistance to plan and implement multi-objective and diverse integrated resource plans, to the extent practicable on a watershed basis. The State should also assist cities, counties, and Local Agency Formation Commissions to prepare a Water Element for their general plans and help them implement existing legislation and State policies to improve coordination between water and land use planning. Additionally, the State needs to pursue legislative and administrative reforms, with guidance from regional planning efforts, to promote integrated resource planning and to overcome regulatory and institutional barriers to effective water planning and resource management.

  This water plan recommends that DWR and other State agencies undertake several essential technical and administrative support activities to assist regional planners in integrating their management strategies with reduced uncertainty and risk. These activities include continued statewide water planning, improving data and tools for regional integrated resource planning, more research and development to commercialize promising water technologies, and improving science programs. The water plan also advances several principles for regional integrated resource planning (see Box 1-xx Principles for Integrated Resource Planning and fuller discussion in Chapter 4 Framework for Future Action).

Box 1-xx Principles for Integrated Resource Planning

- **The State must lead water planning and management activities that (1) regions cannot accomplish on their own; (2) the State can do more efficiently; (3) involve inter-regional or inter-state issues; and/or (4) have broad public benefits.**

  These activities include, but are not limited to (1) preparing California Water Plan updates as a public forum to integrate State, federal, regional, and local plans; (2) operating and maintaining the SWP; (3) providing regulatory oversight to protect public health and safety, including water quality, environmental protection, flood management, and dam safety; (4) participating in major regional initiatives, such as the CALFED Bay-Delta Program; and (5) forming public-private partnerships to implement regional programs like the Colorado River Quantification Settlement Agreement. Other State activities are included in the recommended actions of this water plan.

- **California needs to develop broad and realistic funding strategies and define the role of public investments, to finance needed regional and statewide programs that improve water supply reliability, water quality environmental health, and other water-related resource needs over the next quarter century.**

  Implementing the recommendations of the Water Plan will require significant action and investment by all Californians. Full implementation of all resource management strategies summarized in Strategy Investment Options (see table in Findings and Recommended Actions) would require tens of billions of dollars over the next 25 years. This estimate is consistent with estimates for implementing the CALFED Program. Many of the strategies can be escalated adaptively to meet changing conditions, while others need significant upfront and ongoing financial commitment. Many of these strategies do not have a quantifiable supply benefit, but are necessary for meeting other important water management objectives. The degree of investment indicated in Strategy Investment Options is daunting in light of California's current economic situation, and does not include funding needed to maintain existing water infrastructure.

  One of the key challenges facing policy makers is deciding who ultimately should pay for the different actions needed to improve California's water management system. Local, State, and federal governments and water agencies all have significant financing and implementation roles. However, it is often difficult to quantify both the benefits and beneficiaries of a proposed project.

  The overarching principle for State funding is to invest in activities that proceeds to meet statewide water management objectives. In order to stretch limited funding, California needs more regional planning, public and private partnerships, and collaboration on developing better data and analytical tools. The State can facilitate implementation of water plan recommendations by providing technical, financial, and administrative assistance. There are several actions the State can take to encourage significant new investment in the management of our water resources guided by the funding strategies proposed by the Bay-Delta Program and the California Commission of Building for the 21st Century.

  California Water Plan Update 2004 recommends that the State lead an effort to identify and prioritize funding strategies to finance regional and statewide water planning, programs, and infrastructure. The State needs to clearly articulate when, and for what actions, to use public investments from State and federal sources. California's water finance plan must also recognize the critical role of local public and private funding based on the principle of beneficiary pays and user fees.

- **California needs to rehabilitate and maintain its aging water infrastructure, especially drinking water systems, operated by State, federal, and local entities.**

  The deferred maintenance and aging infrastructure of State, federal, and local water projects, including key water conveyance facilities and drinking water and sewage treatment systems, present risks to public safety, water supply reliability, water quality, and ecological health, due to faulty routine operation, short-term outages, and potential catastrophic failure. Current infrastructure disrepair and outages are in part the result of years of underinvestment in preventative maintenance, repair, and rehabilitation. For example, some facilities of the SWP and the federal Central Valley Project have surpassed their design life and require significant rehabilitation or replacement. Infrastructure failures have disrupted water deliveries in recent years.

  This water plan recommends that the State lead an effort, with input from public and private owners of water infrastructure, to identify and prioritize water infrastructure maintenance of key components with regional or statewide significance. This effort should also identify and implement financing strategies for continued public investments in the resulting infrastructure maintenance plan. This effort would be informed by the findings and recommendations of the California Commission on Building for the 21st Century (2001).

- **California needs to define and articulate the respective roles, authorities, and responsibilities of State agencies and local agencies and governments responsible for water.**

  California has a very large and complex water system with a highly decentralized system of governance involving State and federal agencies, thousands of local governments, private firms, and millions of households and farms making important water management decisions and contributing funding to the system. This decentralization has a major influence on daily management, planning, and policy making. Competing and conflicting roles and responsibilities make it difficult to integrate regional water management. Differing roles of the various State and federal governments during planning can also create coordination difficulties. The organizational structure of State government has led to insufficient communication, coordination, and cooperation among numerous State agencies and departments dealing with water.

  The State needs an internal review of how State resource agencies do business to identify ways to make these agencies more efficient, effective, and responsive to Californians. In light of the growing regional role in water planning and management, and better coordination with land use planning, the State needs to redefine how to empower and assist regional water plans and programs. Establishing a cabinet-level strategic water team would strengthen coordination among State agencies dealing with water and ensure their strategic plans and activities are consistent with the Governor's water initiatives and State policy.

- **DWR, in cooperation with other State, federal, local, and research entities, should improve data and analytical tools needed to prepare, evaluate, and implement regional integrated resource plans and programs.**

  Analytical tool and data development for California has not kept pace with growing public awareness of the complexity and interaction between water-related issues. Deficits exist in current analytical capability related to supply reliability and systems issues. A critical issue facing California is the need for better data and tools to produce useful information about environmental objectives, water quality, economic issues, equity issues, and groundwater and surface water interaction. Also, there is a need to better integrate regional and local planning details into statewide studies.

  California needs better data and analytical tools to produce useful and more integrated information on water quality, environmental objectives, economic and equity issues, and surface and groundwater interaction. A consortium of public and private entities, with State leadership and stakeholder input, should prepare a long-term plan to peer-review and improve data and analytical tools, as well as develop presentation and decision-support tools to make complex technical information more accessible and understandable to decision-makers, resource managers and land use planners. DWR should build and maintain the Water Plan Information Exchange (Water PIE), an online information management system, to assist regional and local agencies and governments.

- **DWR should promote equity in State water planning, management and funding.**

  All Californians currently do not have equal opportunity or equal access to State planning processes, programs and funding for water allocation, improving water quality, and determining how to mitigate potential adverse impacts to communities associated with proposed water programs and projects.

  Tribal water rights for water to meet tribal economic and cultural needs are often encroached upon or unmet. California's water rights framework and federal Reclamation Act policies have evolved over the past 100 years, largely without regard to the water resources reserved for tribal lands. Previous Water Plan updates did not consider tribal interests or water demands. The Water Plan recommends that DWR should invite, encourage and assist tribal government representatives to participate in statewide, regional, and local water planning processes and access State funding for water projects. DWR should include tribal water concerns and water uses in future Water Plan updates and engage appropriate local, State and federal agencies to resolve tribal water issues that are identified.

  Californians from disadvantaged and under-represented communities continue to face inequities with respect to distribution of clean water, participation in water policy and management decisions, and access to State funding for water projects. The Water Plan recommends that DWR promote Environmental Justice as a State planning priority and encourage and assist representatives from disadvantaged communities and vulnerable populations to participate in statewide, regional, and local water planning processes and access State funding for water projects.

Vision

Water resource management facilitates a vital economy, a healthy environment, and a high quality of life in California.

For a description of the components of a strategic plan as used for the Water Plan see Box 1-xx presented above.

Mission

To develop a strategic plan for adequate, reliable, secure, affordable and sustainable water of suitable quality for all beneficial uses to: (1) preserve and enhance the standard of living for Californians; (2) strengthen economic growth and revitalize business and the agricultural industry; and (3) restore and protect its unique environmental diversity.

Goals and Objectives

Goals are the desired end result of this Water Plan over its planning horizon to 2030. Objectives are specific and measurable targets for accomplishing one or more goals. The recommended actions of this Water Plan are by in large treated as objectives.

The primary goals of *California Water Plan Update 2004* are:

- Regions play a central role in California water planning and management
- The State of California provides strong leadership, oversight and public finding to promote good water management
- Water, resource and land use planners make more informed and less risky water management decisions
- Efficient development patterns protect, preserve and enhance environmental and agricultural resources
- Greater equity concerning benefits and impacts of water decisions promotes public health and safety in urban, suburban and rural communities

These goals along with the key objectives of the Water Plan and how they relate to the recommended actions are presented in Table 1-xx.

Table 1-xx Goals, Objectives and Related Recommended Actions

Goals	Objectives	Related Recommended Actions
1. Regions play a central role in California water planning and management	a. Regions develop regional integrated resource plans to meet multiple water management objectives. b. Local and regional planners diversify and increase the resource management strategies in their integrated resource plans. c. Regions invest in water conservation, efficient water management, and development of reliable, high quality, sustainable and affordable water supplies	1, 2
2. State of California provides strong leadership, oversight and public funding to promote good water management	a. State leads activities that regions cannot accomplish on their own; that it can do more efficiently; and that involve inter-regional, inter-state or international issues. b. State invests in water conservation, efficient water management, and development of reliable, high quality, sustainable and affordable water supplies that have broad public benefits. c. State leads an effort to develop broad and realistic funding strategies that define the role of public investments for water and other water-related resource needs over the next quarter century. d. State leads an effort to develop an infrastructure rehabilitation and maintenance plan for State, federal, and locally operated infrastructure. e. State leads an effort to define and articulate the respective roles, authorities, and responsibilities of State agencies and local agencies and governments responsible for water. f. State inventories, evaluates, and deals with the effects of contaminants on surface water and groundwater quality. g. The CALFED Bay-Delta Program has greater federal commitment, agency involvement, spending authorization, and funding to ensure continued and balanced implementation.	1, 3, 4, 5, 6, 7, 13
3. Water, resource and land use planners make more informed and less risky water management decisions	a. Planners prepare integrated resource plans consistent with the principles advanced in this Water Plan (see Box 1-xx) b. DWR, in cooperation with other State, federal, tribal, local, and research entities, improves data and analytical tools needed to prepare, evaluate, and implement regional integrated resource plans and programs. c. State invests in research and development to commercialize promising water technologies and to help predict and prepare for the effects of global climate change.	8, 9
4. Efficient development patterns protect, preserve and enhance environmental and agricultural resources	a. Local governments and agencies improve coordination between land use planning with water planning and management to ensure that that new infrastructure has adequate water supply. b. DWR and other State agencies explicitly consider public trust values in the planning and allocation of water resources to protect public trust uses whenever feasible. c. DWR develops Water Plan consistent with State planning priorities (Chapter 1016, Statues of 2002) to promote infill development, encourage efficient development patterns, and protect, preserve and enhance environmental and agricultural resources.	2, 10
5. Greater equity concerning benefits and impacts of water decisions promotes public health and safety in urban, suburban and rural communities	a. DWR invites, encourages and assists tribal government representatives to participate in statewide, regional, and local water planning processes and access State funding for water projects. b. DWR and other State agencies encourage and assist representatives from disadvantaged communities and vulnerable populations to participate in statewide, regional, and local water planning processes and access State funding for water projects.	11, 12

The water management objectives described in Box 1-xx and shown in the Strategy Investment Options table relate to several of the goals and objectives of this water plan.

Box 1-xx Water Management Objectives

Implementation Plan

Chapter 5 lays out the implementation plan for the *California Water Plan Update 2004*. The implementation plan includes each of the recommended actions in Findings and Recommended Actions and elaborated in Chapter 4 Framework for Future Action with its related action plan, intended outcomes, resource assumptions, implementation challenges and performance measures. The chapter also includes a discussion of implementation costs with reference to strategies, options, and guidelines for public investments and State financial assistance also described in Chapter 4.

Phased Work Plan

California Water Plan Update 2004 is being prepared and presented in three phases. Distribution of the public review draft of this five-volume publication marks the end of the first phase. This water plan update is based on the best available data and information and input from an active and diverse advisory committee. It also documents gaps in data and analytical tools and makes policy recommendations.

Phase 2, which began in 2004, provides a final *California Water Plan Update 2004*, which will include revised policy recommendations based on wide public input and numerous public hearings. It also documents the data and analytical tools that DWR will use in Phase 3.

In 2005, DWR will begin work on Phase 3, initiating the process for *California Water Plan Update 2008*, with the participation of a broad public advisory committee. DWR will begin to quantify and evaluate three future scenarios and alternative management responses using the data and tools identified in Phase 2. It will use a water flow diagram to present evaluation results for wet and dry year conditions and a California Department of Food and Agriculture food forecast for estimating future irrigated crop water use.

As part of its ongoing strategic planning process, DWR will present its findings from Phase 3 evaluations to the public as they become available. And as a strategic plan, the findings, recommended actions, and the implementation plan of the *California Water Plan Update 2004* will be periodically reviewed and revised. DWR will publish five other water plan updates during this Plan's 2030 planning horizon.

Document Organization

Organized in five volumes, *California Water Plan Update 2004* has the following information that supports and elaborates the findings and recommended actions:

- The condition of California's water resources and system; estimates of current statewide water supplies and uses; regional, State and federal water planning and programs; and how water is managed, allocated, used, and regulated in California (Chapter 2 of Volume 1).
- Significant uncertainties and risks that impact water planning, including extreme hydrologic events like multiyear droughts; three plausible scenarios for estimating future water supplies and uses; an analytical framework for filling data gaps and improving analytical tools for subsequent phases and updates of the water plan; and an initial estimate of additional water demands by 2030 assuming the continuation of current trends (Chapter 3 of Volume 1).
- Regional, State and federal roles, responsibilities, and commitments to foster, assist and finance local and regional water planning and management. Essential support activities and guidelines for integrated resource planning and State assistance (Chapter 4 of Volume 1).
- Actions plans with intended outcomes, resource assumptions, implementation challenges and performance measures to implement the Water Plan's recommended actions (Chapter 5 of Volume 1).
- Practices, issues, roles, recommendations for implementing 25 resource management strategies to promote, improve and diversify regional integrated resource plans and management (Volume 2 Resource Management Strategies).
- Regional reports for each of the 10 hydrologic regions plus 2 overlay areas, Sacramento-San Joaquin Delta and Mountain Counties, including detailed estimates of current water supplies and uses (Volume 3 Regional Reports).
- Supplemental articles and information developed for this Water Plan (Volume 4 Reference Guide).
- Documentation on data, tools, and methods (Volume 5 Technical Guide).

Boxes

Box 1-xx Updates of the California Water Plan

The California Water Plan is the State's strategic plan for managing and developing water resources statewide. Since its first California Water Plan, published as Bulletin 3 in 1957, DWR has prepared seven water plan updates, known as the Bulletin 160 series. The Water Code now requires the water plan to be updated every five years; the last update was published in 1998.

Bulletin No. 3 described a comprehensive master plan for the control, protection, conservation, distribution, and utilization of the waters of California, to meet present and future needs for all beneficial uses and purposes in all areas of the State to the maximum feasible extent. It was an ultimate plan that indicated the general manner in which California's water resources should be developed to satisfy the potential ultimate water requirements of the State.

Statewide planning studies to update the California Water Plan have continued since 1961. Each update took a distinct approach to water resources planning, reflecting issues or concerns at the time of its publication.

Implementation of the California Water Plan (1966). The first of the Bulletin 160 series, Bulletin No. 160-66 was a proposed pattern for implementation of specific parts of The California Water Plan as set forth by the California Water Code. Some water policy concerns included flood control and floodplain management, power demands, water-related recreation, the relationship of fish and wildlife to water development, and water quality.

Water for California: The California Water Plan; Outlook in 1970. By 1967 the growth rate of California's population had slowed from that of the 1950s; population projections for 1990 and 2020 were reduced. Irrigated acreage estimates were also reduced, and more accurate information on the consumptive use of crops and the extent of water reuse was available. With projects then under construction or authorized, the report concluded that sufficient water supplies would be available to meet most of the 1990 requirements. The trend toward increasing environmental awareness was noted for both the national and State levels.

The California Water Plan: Outlook in 1974. This report concluded that the status of available supplies was favorable based on the premise that the Auburn, New Melones, and Warm Springs reservoirs and the Peripheral Canal would be operational by 1980. But it was less conclusive about the extent to which supplies would satisfy future needs, considering new California legislation for wild and scenic rivers. Key water policy issues were cooling water for electric energy production, water deficiencies (risk), water exchanges, public interest in agricultural drainage (San Joaquin Drain), water use efficiency (water conservation), economic efficiency (water transfers), and wastewater reclamation.

The California Water Plan: Projected Use and Available Water Supplies to 2010 (1983). More a technical report than previous editions, part of the process included the development of agricultural models applied for the first time. These were used in assessing the general economic effects of increasing water and energy costs. The report quantified the effect of urban and agricultural water conservation measures and the potential for water reclamation as a means of reducing water needs.

California Water: Looking to the Future (1987). Bulletin 160-87 took a broad view of water events and issues in California. The report also discussed several leading water management concerns including water quality, the Sacramento-San Joaquin Delta, and evolving water policies over a wide range. One of its main conclusions was that in roughly three out of four years, California's natural water resources, including rights to the Colorado River, were sufficient to meet all of its water needs for the foreseeable future.

California Water Plan Update: Bulletin 160-93 (1994). This report discussed how population growth, land use, and water allocations for the environment were affecting water resource management. It differed from the five previous water plan updates by (1) estimating environmental water needs separately and accounting for these needs along with urban and agricultural water demands, (2) presenting water demand management methods as additional means of meeting water needs, and (3) presenting separate water balance scenarios for average and drought conditions. This was the first of the Bulletin 160 series to incorporate an advisory committee of representatives of interested parties.

The California Water Plan Update: Bulletin 160-98 (1998). The 1998 update evaluated water management options that could improve California's water supply reliability. By 1995, locally developed water supplies represented 70 percent of California's total developed water supplies. Water management options being planned by local agencies form the building blocks for evaluations performed for each of the State's 10 hydrologic regions. Potential local options were integrated with options of a statewide scope to create a statewide evaluation.

(See fuller descriptions in Volume 4 Reference Guide)

Box 1-xx Legal Requirements for Water Plan Update

The California Water Plan – Update 2004 must at a minimum meet requirements specified in the Water Code about its purpose, content, and process. The advisory committee, extended review forum, and public may suggest to the Department of Water Resources additions to the Water Plan Update that do not conflict with the Water Code.

Purpose

The following excerpts from the Water Code and other legislation address the purpose of the California Water Plan and its updates:

> A long-term, reliable supply of water is essential to protect and enhance California's natural resources and economic climate. (Section 1(a), Chapter 720, 2000 Session Laws)
>
> The plan for the orderly and coordinated control, protection, conservation, development, management and efficient utilization of the water resources of the State, which is set forth and described in Bulletin No. 1 of the State Water Resources Board entitled "Water Resources of California," Bulletin No. 2 of the State Water Resources Board entitled, "Utilization and Requirements of California," and Bulletin No. 3 of the department entitled, "The California Water Plan," with any necessary amendments, supplements, and additions to the plan shall be known as "The California Water Plan." (Section 10004(a))
>
> … The California Water Plan … is accepted as the master plan which guides the orderly and coordinated control, protection, conservation, development, management and efficient utilization of the water resources of the state. (Section 10005(a))
>
> The California Water Plan "does not constitute approval for the construction of specific projects or routes for transfer of water, or for financial assistance, by the state, without further legislative action, nor shall (The California Water Plan) be construed as a prohibition of the development of the water resources of the state by any entity." (Section 10005(b)).

Content

The following excerpts from the Water Code and other legislation address the content of the California Water Plan and its updates:

> Without credible and accurate estimates of water supply needs, it is impossible to ensure that water programs, policies, and investments are appropriate to meet all residential, commercial, industrial, agricultural, and environmental needs. (Section 1(c), Chapter 720, 2000 Session Laws)
>
> … to ensure the state makes appropriate investments in water programs, policies, and facilities, there needs to be a credible and objective assessment of the state's future water supply needs. (Section 1(e), Chapter 720, 2000 Session Laws)
>
> As part of the requirement of the department to update The California Water Plan … the department shall include in the plan a discussion of various strategies that may be pursued to meet the State's future water needs, including, but not limited to, those relating to the development of new water storage facilities, water conservation, water recycling, desalinization, conjunctive use, and water transfers that may be pursued to meet the future water needs of the state. The department shall also

include a discussion of the potential for alternative water pricing policies to change current and projected uses. (Section 10004.5)

The department shall include in the plan a discussion of the potential advantages and disadvantages of each strategy and an identification of all federal and state permits, approvals, or entitlements that are anticipated to be required in order to implement the various components of the strategy. (Section 10004.5)

Recently Enacted Legislation

SB 1062 (Poochigian, Chapter 210, Statutes of 1999) - The California Water Plan.
Senate Bill 1062 requires DWR to include various strategies for meeting the state's water supply needs in its updates to the California Water Plan. The update must identify all federal and state permits, approvals or entitlements that might be required in order to implement the strategies. It also establishes an advisory committee to help DWR update the plan.

SB 1341 (Burton, Chapter 720, Statutes of 2000) - State Water Plan.
Requires DWR to release a preliminary Draft of the California Water Plan's water assumptions and estimates and restructures Water Code Section 10004 relevant to the California Water Plan.

SB 672 (Machado, Chapter 320, Statutes of 2001) - Regional Planning & Water Plan Update.
Requires the State to include in the California Water Plan, a report on the development of regional and local water projects, within each hydrologic region to improve water supplies to meet municipal, agricultural, and environmental water demands and minimize the need to import water from other hydrologic regions. This bill also requires urban water suppliers to describe in their urban water management plans, water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

AB 857 (Wiggins, Chapter 1016, Statues of 2002) - State Strategic Planning.
Assembly Bill 857 establishes three specific planning priorities for State strategic plans:

- To promote infill development and equity by rehabilitating, maintaining, and improving existing infrastructure, particularly in underserved areas, and to preserving cultural and historic resources.
- To protect, preserve and enhance environmental and agricultural resources, including working landscapes (farm, range, and forest lands), natural lands (wetlands, watersheds, wildlife habitats, and other wildlands), recreation lands (parks, trails, greenbelts), and other open space.
- To encourage efficient development patterns.

AB 2587 (Matthews, Chapter 615, Statues of 2002) – Food: Water Usage Forecasts.
Requires the Department of Food and Agriculture to estimate food, fiber, livestock, and other farm products production and provide that information to the Department of Water Resources for estimating related water usage reported in Bulletin 160.

Box 1-xx Components of a Strategic Plan as Used for the Water Plan

Internal/External Assessments - An analysis and evaluation of key data and factors that influence the success of achieving the Water Plan's goals. In developing a strategic plan, an agency should consult with the Legislature and solicit and consider the views and suggestions of entities, such as customers and other stakeholders, potentially affected by or interested in the Water Plan.

Vision - A compelling, conceptual, vivid image of the desired future for California water resources and management. A vision statement crystallizes what the Water Plan wants California water to be in the future. It is not bound by time, represents global and continuing services, and serves as a foundation for future water planning.

Mission - A statement reminding everyone—the public, the Governor, legislators, the courts, and agency personnel—of the unique purposes promoted and served by the Water Plan. The Water Plan's unique purpose, and overarching reason for existence, is described in statute. The mission statement succinctly identifies what the Water Plan should do and why and for whom it does it.

Goals - The desired end results of the Water Plan and general ends toward which the State directs its efforts. The goals address the primary water issues facing the State within broad groupings of interrelated State concerns. The goals are founded on the statewide vision and may involve coordination among several agencies with similar functions.

Objectives – The specific and measurable targets for accomplishing a goal. The recommended actions of this Water Plan represent objectives. They mark interim steps toward achieving the plan's long-term mission and goals and emphasize the intended results of actions at the end of a specific time.

Action Plan - A detailed description of the key activities to implement each objective and specifies the entity(s) best positioned to play a key role in implementation. Action plans break activities into manageable parts including assignments, resource assumptions, implementation challenges and performance measures for tracking progress.

Performance Measures - The methods used to ensure accountability to measure work performed and results achieved. It describes what is to be measured, and methods of measurement. The measure may be short- intermediate- and/or long-term.

Box 1-xx Analytical Changes

The *water portfolios* and *water balances* in this Water Plan Update include actual data for a recent dry water year, 2001. Planning for drought conditions, extreme and prolonged dry years, is significant for water resources planners, managers, and decision-makers. This drought condition cannot be described by using actual data for a single water year. Previous Water Plans considered drought conditions by using trend-based data from a sequence of dry years.

DWR and AC decided not to use the prior method for forecasting future water conditions, but instead to initiate a phased work plan to develop the data and analytical tools that can analyze multiple *future scenarios* and management *responses strategies*. Consequently, this Water Plan Update does not include quantified water balances for future conditions and a shortage analysis as were presented in prior Water Plans. In the interim, the narratives for three future scenarios can not be compared to forecasts from previous Updates because of significant differences in the method and level of analysis.

Because shortages are location-specific in California, the statewide estimates of potential water supply benefits for the various *resource management strategies* (summarized in Strategy Investment Options table) can not be used to evaluate local shortages. For instance, water supply benefits achieved in an area that does not have a water shortage, may not contribute to reducing a shortage elsewhere. However, the supply benefit may serve other useful purposes in the area it occurs. DWR can evaluate the effectiveness of the resource management strategies at overcoming local shortages after it has quantitatively analyzed the future scenarios and responses.

Box 1-xx Principles for Integrated Resource Planning

Use a broad, long-term perspective

Use a comprehensive stakeholder-based planning process to: (1) promote multi- objective planning with a regional focus, (2) emphasize both local and regional initiatives, (3) recognize unique regional problems and resources, and (4) emphasize long-term planning (30-50 year planning horizon).

Identify broad benefits, costs and tradeoffs

Evaluate program and projects recognizing economic growth, environmental quality, and social equity as co-equal objectives. Based on this comprehensive assessment, determine potential economic, environmental, and social benefits, beneficiaries, costs, and tradeoffs; and include a plan to avoid, minimize and mitigate for adverse impacts.

Promote sustainable resource management

Promote the wise use of all natural resources to insure their availability for future generations. This can be done by promoting activities with the greatest benefit for the entire region and activities that consider the interrelationship between regional water supplies, water quality, water infrastructure, flood protection, recreation, land use, economic prosperity, and the environment.

Increase regional self-sufficiency

Increase regional self-sufficiency by considering activities that reduce the need to import water from another hydrologic region, particularly during times of limited supply availability such as during a drought or after a catastrophic event like an earthquake.

Increase regional drought preparedness

Evaluate and implement strategies that among other benefits would reduce the impacts of drought in the region. In California, drought contingency planning is an important component of regional water planning. Examples of such strategies include recycled municipal water, conjunctive management and groundwater storage, surface storage, system reoperation, desalination, and water use efficiency.

Promote environmental justice

All projects sponsored by or partnered with the State, and/or using public funds must promote environmental justice, which is the fair treatment of people of all races, cultures, and incomes with respect to the development, funding and implementation of resource management projects.

Promote coordination & collaboration among local agencies & governments

Promote and improve coordination and collaboration among local agencies and governments within a region, particularly those that are involved in activities that might affect the long-term sustainability of water supply and water quality within the region. Regional planning should include a public review process with open and transparent decision-making, as well as education and outreach for public, stakeholders, and decision-makers.

Use sound science, best data, and local knowledge

Use the best available data and information and, when possible, use planning methods and analytical techniques that have undergone scientific review.

Box 1-xx Water Management Objectives

Integrate and Optimize Management Strategies – Improve the ability of resource planners and managers to optimally mix and match the maximum number of resource management strategies in their regional plans.

Reduce Uncertainty or Minimize Risk – Reduce the uncertainty risks associated with water planning and management decisions because of data gaps, insufficient analytical capabilities, incomplete scientific understanding, short and long term climate variations, and unpredictable events.

Provide Water Supply Benefits – Reduce water demands, improve operational efficiency, reallocate water, and/or augment water supplies.

Improve Drought Preparedness - Reduce the economic, environmental, and social impacts of drought on regions, including, but would not be limited to activities that increase water conservation, reduce dry year demand, increase surface or groundwater storage, allow short-term transfers of surplus water, or increase reuse of water.

Improve Water Quality - Improve water quality by matching water quality to its use (i.e. water management) or by using treatment technology. Other water management strategies, such as storage, conveyance, and water use efficiency, may also benefit water quality. Water quality is also improved by preventing or reducing pollution, agricultural drainage and urban runoff.

Improve System Flexibility and Efficiency – Increase the linkage among water management facilities in a way that results in increased beneficial use and reuse of water overall. For example, additional interconnection among neighboring water districts can facilitate short term water transfers during dry years and reduce the potential impacts of drought.

Reduce Flood Impacts - Reduce risks from floods to life and property by minimizing impacts of flood flows to developed land; maintaining or restoring natural floodplain processes; removing obstacles within the floodplain, voluntarily or with compensation; educating the public about avoiding flood risks and planning for emergencies; Developing policies for appropriate land use in existing undeveloped floodplains.

Provide Environmental Benefits – Protect, restore or enhance the environment. This may include instream flow and timing changes, temperature management, habitat restoration, physical modification to water bodies, reduction of diversion impacts to fisheries (e.g. fish screens), control of waste discharge in waterways, exotic species control, removal of barriers to anadromous fish migration, land and water acquisitions, and fire management.

Increase Energy Generation or Reduce Use – Generate additional energy supplies or reduce the consumption of energy.

Increase Recreation Opportunities – Provide or enhance recreational opportunities in fresh water bodies such as lakes, reservoirs, and rivers; and outdoor recreation activities enhanced by water like wildlife viewing, picnicking, camping and hiking.

Reduce Groundwater Overdraft – Reduce the condition where, over the long term, the amount of groundwater withdrawn by pumping exceeds the amount of water that recharges the basin. Groundwater overdraft is characterized by groundwater levels that decline over a period of years and never fully recover, even in wet years.